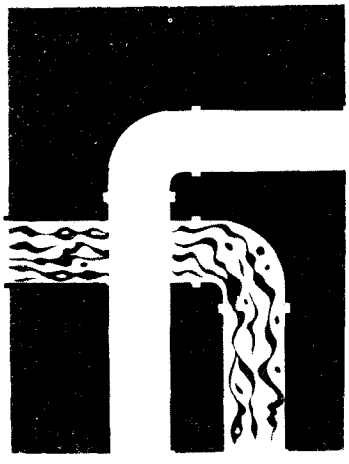
Purpose and Scope



Public health officials have long been concerned about cross-connections and backflow connections in plumbing systems and in public drinking water supply distribution systems. Such cross-connections, which make possible the contamination of potable water, are ever-present dangers. One example of what can happen is an epidemic that occurred in Chicago in 1933. Old, defective, and improperly designed plumbing and fixtures permitted the contamination of drinking water. As a result, 1,409 persons contracted amebic dysentery; there were 98 deaths. This epidemic, and others resulting from contamination introduced into a water supply through improper plumbing, made clear the responsibility of public health officials and water purveyors for exercising control over public water distribution systems and all plumbing systems connected to them. This responsibility includes advising and instructing plumbing installers in the recognition and elimination of cross-connections.

Cross-connections are the links through which it is possible for contaminating materials to enter a potable water supply. The contaminant enters the potable water system when the pressure of the polluted source exceeds the pressure of the potable source. The action may be called backsiphonage or backflow. Essentially it is reversal of the hydraulic gradient that can be produced by a variety of circumstances.

It might be assumed that steps for detecting and eliminating cross-connections would be elementary and obvious. Actually, cross-connections may appear in many subtle forms and in unsuspected places. Reversal of pressure in the water may be freakish and unpredictable. The probability of contamination of drinking water through a cross-connection occurring within a single plumbing system may seem remote; but, considering the multitude of similar systems, the probability is great.

Why do such cross-connections exist?

First, plumbing is frequently installed by persons who are unaware of the inherent dangers of cross-connections. Second, such connections are made as a simple matter of convenience without regard to the dangerous situation that might be created. And, third, they are made with reliance on inadequate protection such as a single valve or other mechanical device.

To combat the dangers of cross-connections and backflow connections, education in their recognition and prevention is needed. First, plumbing installers must know that hydraulic and pollutional factors may combine to produce a sanitary hazard if a cross-connection is present. Second, they must realize that there are available reliable and simple standard backflow prevention devices and methods that may be substituted for the convenient but dangerous direct connection. And third, it should be made clear to all that the hazards resulting from direct connections greatly outweigh the convenience gained.

This manual does not describe all the cross-connections possible in piping systems. It does attempt to reduce the subject to a statement of the principles involved and to make it clear to the reader that such installations are potentially dangerous. The primary purpose is to define, describe, and illustrate typical cross-connections and to suggest simple methods and devices by which they may be eliminated without interfering with the functions of plumbing or water supply distribution systems.